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## **Factors Affecting SMEs' Willingness to Share Knowledge Online: A Path Model**

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### **Abstract**

*This paper presents the findings of a study of SME owner-managers that examined their willingness to share information online with other members of a local business network. The main variables associated with willingness to share knowledge online were found to be willingness to share information in conventional modes and the intensity with which they used the internet for business activities. A number of other variables were found to be indirectly or unrelated to willingness to share knowledge online. A significant locality effect was also identified which suggests that the social context of the network to which the business belonged influences willingness to share knowledge online. Our work supports previous research which concludes that online knowledge sharing initiatives should enhance relationships within the business network itself as well as the technical aspects of the networking platform and the technical competence of potential users.*

**Keywords:** SME, online knowledge sharing, networks, locality influences, ICT, survey

### **1 Introduction**

The benefits that a small or medium enterprise (SME) can derive from sharing knowledge with other businesses has long been recognised and is well documented (e.g. Bartholomew & Smith 2006; Hughes et al. 2009; Thorpe et al. 2005; Van Laere & Heene 2003; Whittaker et al. 2003). To support this knowledge sharing, many initiatives have been undertaken to establish networks of SMEs, often based on some common element such as whether they are in the same industry or the same location. Such

networks can provide their members with access to specific knowledge and advice about production techniques, government regulations and economic trends (Fuller-Love & Thomas 2004; Hughes et al. 2009; Miller et al. 2007). The networks can also provide personal support and experience-based knowledge of management approaches (Hughes et al. 2009). In some contexts SME networks can generate business intelligence, innovation opportunities, new projects and alliances (Fuller-Love & Thomas 2004).

The power of information and communication technology (ICT) for supporting business networking has not been overlooked. In particular, internet use has become almost universal in developed countries and business networks can use it to facilitate online knowledge-sharing by SMEs in extensions of existing networks or entirely new 'virtual' initiatives (Matlay & Martin 2009; Mustaffa & Beaumont 2004; Romano et al. 2001). However, online SME business networking has been slow to develop despite the promise of greater reach, power and convenience it offers. Many initiatives by governments and industry associations to promote online knowledge sharing by improving network accessibility and providing greater value to both individual businesses and their local communities have not lived up to expectations (Beckinsale et al. 2006; Fisher & Craig 2005; Gengatharen & Standing 2005b). SME owner-managers appear to be highly cautious about sharing information electronically. It has been reported that even SME owner-managers who recognise the benefits of ICT for knowledge sharing are reluctant to use such channels (e.g. Chen et al. 2006).

In this paper we develop a model of online knowledge sharing in business networks which we believe will assist governments and other third parties wanting to encourage participation by SMEs. The variables in the model include characteristics of owner-managers, their businesses and business environments (including the online environment) anticipated to be associated with 'willingness to share knowledge online' in networks.

We begin by examining relevant previous research and identification of key variables, then present results of a survey of SME owner-managers which sought their views about sharing business information in networks, both online and face-to-face. Finally, we discuss the implications of the results and our final model of the factors of SME owner-managers' willingness to share knowledge online in business networks.

## **2 Literature Review**

Knowledge sharing has been recognised as an important means of improving the performance of SMEs (Chaston & Mangles 2000; Fuller-Love & Thomas 2004; Hughes et al. 2009; Watson 2007) and for overcoming their lack of internal resources (Corso et al. 2003; Desouza & Awazu 2006; McAdam & Reid 2001).

The small size of SMEs frequently confines their operations to a single locality. Consequently, SME owner-managers often obtain much of their external information and knowledge in locally-based social networks (Bartholomew & Smith 2006; Van Laere & Heene 2003; Whittaker et al. 2003) and informal face-to-face interactions (Chen et al. 2006; Wong & Radcliffe 2000). These local networks are a trusted source of information/advice supporting new business development and can lead to new business opportunities (Shaw 2006; Molina-Morales, & Martínez-Fernández 2010; Pirolo & Presutti 2010).

With the increased use of ICT, the question arises about the extent to which electronically mediated communication can contribute to SME owner-managers' knowledge-sharing activities in business networks. Some research suggests that many owner-managers have difficulty sharing knowledge other than in face-to-face interactions (Nan 2008). Much previous research in this area looks intra-organisationally and examines knowledge sharing from a knowledge management perspective (Nunes et al. 2006; Wong & Aspinwall 2004). Other studies have examined

factors influencing the success and failure of SME business-to-business (B2B) community portals (Fisher & Craig 2005; Gengatharen & Standing 2005b). These studies have focussed primarily on technology and B2B commerce among SMEs. Some studies have investigated online SME business networks, but have focussed on the influence such networks have on the adoption of eBusiness applications (Beckinsale et al. 2006; MacGregor & Vrazalic 2007) or have had an industry-specific focus, for example investigating the role industry bodies play in establishing and coordinating SMEs' online knowledge sharing (eg Cegarra Navarro & Dewhurst 2006, Ho et al 2003).

However, there has been little research about the qualities of SME owner-managers that is related to their willingness to share knowledge online and the networks and the broader social context in which they operate, especially where there is no overriding industry to coordinate and manage the interactions and where the participant SMEs are located in a variety of industries. Thus, the research question underpinning this paper is:

**RQ: What factors are associated with SME owner-managers' willingness to share business knowledge online in (non-industry-specific) business networks?**

To begin to answer this question we develop a model containing a number of factors that are associated with SMEs owner managers' willingness to share knowledge online in networks. Our aim is not to create a model containing (only) *explanatory* variables; we are more interested in creating a model that *describes* SME owner-managers who are willing to share knowledge online in networks. Therefore, while the factors we include in the model are known (from the literature) to be associated with willingness to share knowledge online, many of the factors (for example, 'Involvement in business networks', 'Extent of internet use in the business' and 'Geographical focus') are quite general and are intended to capture an overall concept. These general factors could be more precisely defined using indicator variables but in this paper we measure most in a relatively simple way using only a small number of indicators (see Table 1 below).

The factors we include in the model are:

- *Involvement in business networks.* SME owner-managers are more comfortable with network participation when they are highly active in one business network or belong to a number of different networks (Chipika & Wilson 2006; Miller et al. 2007). A higher level of involvement in business networking in general, would be expected to lead SME owner-managers to share knowledge and seek advice of others in the online context.
- *Extent of internet use in the business.* SME owner-managers familiar with and confident in using ICT are more likely to adopt eBusiness applications (Al-Qirim 2005; Del Aguila-Obra & Padilla-Meléndez 2006; Dholakia & Kshetri 2004; Wymer & Regan 2005). Familiarity and confidence with a wider range of internet-based applications could also lead to greater willingness to share knowledge online.
- *Type of industry.* Different industries have different knowledge requirements, so the industry to which a business belongs can affect the extent to which SME owner-mangers engage in networking and other knowledge sharing activities (Watson 2007).
- *Geographical focus.* The full benefit of knowledge sharing in a business network occurs when external information becomes accessible to those within that network (Spence 2004). SMEs that predominantly trade internally (within their locality) would be expected to be less willing to share knowledge online than those primarily trading outside their local region.

- *Age of the business.* Younger enterprises have a strong business predisposition for engagement to expand their knowledge resources (Chen et al. 2006; Salojarvi et al. 2005; Wong & Radcliffe 2000). To the extent that that younger businesses have greater need for knowledge and connection, we would expect them to show a greater propensity to share knowledge online.
- *Size of the business.* Firm size has been shown to influence the extent to which eBusiness applications are adopted and/or how the applications are used (e.g. Burke 2005; Levenburg 2005; Shin 2006). In contrast to small businesses, large organisations have access to considerable internal resources including staff specialising in online business operations (MacGregor & Vrazalic 2006) and this support facilitates online knowledge sharing. We would expect that larger SMEs could be more inclined to share knowledge online than their smaller counterparts.
- *Entrepreneurial outlook.* Entrepreneurial business owners anticipate and seek growth and are more inclined to achieve such growth through making contacts and sharing knowledge (Bozbura 2007; Chipika & Wilson 2006; Edwards 2007; Fuller-Love & Thomas 2004; Thorpe et al. 2005). An entrepreneurial outlook, which might be indicated by expectations of higher business growth, would be expected to be associated with an inclination for sharing knowledge and making contacts online.

### 3 Method

SMEs involved in business networks in two medium-sized Australian cities and their environs were selected for the study. The cities were chosen because they both had active business networks and were structurally similar (demographically, in industry composition, ICT use and distance from the capital city). They had, however, somewhat different levels of involvement of SMEs in business networks (see Tables 1 and 2 below), reflecting different contexts within which the businesses operated. Data and information was collected in three stages from a range of sources, enabling a nuanced understanding of both localities, including their social and business dynamics, the characteristics of SMEs, and the major networks that operated within those regions. Initial interviews with 23 local industry and government informants provided background information about the economy and social climate of the localities.

A survey sample was drawn of SME owner-managers who were members of the key business network in each city. These networks were open to businesses of any type and were not allied to any particular industry. The coordinators of each network supplied a list of businesses with 50 employees or fewer. From these, a random selection of 333 businesses were invited to participate in a telephone interview; 192 interviews were completed, 106 from one region and 86 from the other, providing a 58% response rate.

The survey instrument consisted of structured questions about the business, the owner-managers' participation in the local network, their use of the internet and associated applications, and their knowledge sharing both within their network and online with other network members.

Key variables and constructs used in this study were derived from the analysis of issues raised in the literature presented above, coupled with those raised in the first stage interviews with industry and government representatives. These key variables are summarised in Table 1.

Factor	Variable Name	Variable Description
Willingness to share business information online	OnlineShare	Respondents' rated their willingness to share information online about their business with other businesses in the region: Not willing (0); Somewhat willing (1); Willing (2).
Age of the business	BusinessAge	Respondents stated how long their firm had been operating in the region (years).
Size of the business	NumEmployees	Respondents reported the number of people currently employed in the organisation.
Involvement in business networks	NetworkNum	Respondents stated the number of business networks in which they were involved.
	NetworkActivity	Respondents rated their level of activity in local business networks: Not active (0); Occasional (1); Active (1).
	NetworkShare	Respondents rated their willingness to share information about their business in the business network: Not willing (0); Somewhat willing (1); Willing (2).
Intensity of internet use in the business	InternetUse	<p>This variable is the sum of responses to three questions that related to:</p> <ul style="list-style-type: none"> <li>Types of information they get from the web (e.g. customer, best practice, industry), each rated as: None (0); Occasionally (1); Regularly (2).</li> <li>The number of internet technologies, other than the web, they used in the business. Only Email and VOIP were considered.</li> <li>The number of features in the respondent's web site (e.g. taking orders, providing customer support, issuing online updates).</li> </ul> <p>Note: This variable is a measure of the intensity of ICT use in the business, whether or not that use supports knowledge-sharing activities. Nearly all respondents reported that their business used ICT, even if only for email. However, some used quite sophisticated applications. The range of this variable was therefore quite large: Minimum 0, Maximum 20.</p>
Entrepreneurial outlook	ExpectedGrowth	Respondents rated the growth prospects for their business in the next two years: Decrease (-1); Stay the same (0); Grow steadily (1); Grow rapidly (2).
Geographical focus	PercentLocal	Respondents reported the percentage of their business that was conducted within the region (0-100%),
Industry Type	IndustryType	The type of industry was classified using Australian Government Industry codes: 0 = Manufacturing or Production (n = 49); 1 = Service (n = 143).
Locality	Locality	This indicator (0-1) variable is for the two localities; it was included in the analysis to capture any possible locality effect. Our rationale for its inclusion was the stage one analysis revealed that the key network in one city was highly mobilised, vibrant and strongly supportive of new business; whilst the other city's key network was much less active, described by participants as being exclusive and not welcoming to new members who were not already socially connected.

**Table 1:** Key variables and their indicators

The main dependent variable for the model was *OnlineShare*: Willingness to share business information online. All of the other variables were treated as independent variables for analysis purposes. All variables except *Locality* were ordinal or interval measures. Data from the survey were analysed using regression analyses to construct a path diagram showing the direct and indirect associations between the independent variables and the dependent variable *OnlineShare*.

## 4 Results

Table 2 presents a summary of the measured factors for each locality.

Variable	Locality 1 (n=106)		Locality 2 (n = 86)		Overall (n = 192)	
	Mean	St Dev	Mean	St Dev	Mean	St Dev
OnlineShare	1	0.9	1.4	0.7	1.2	0.8
BusinessAge	17.2	18.9	13.8	25.3	15.7	22
NumEmployees	12.6	19.8	12.1	20.3	12.4	20
NetworkNum	1.6	1.4	2.2	1.5	1.9	1.4
NetworkActivity	0.9	0.7	1.2	0.7	1	0.7
NetworkShare	1.4	0.7	1.7	0.5	1.5	0.6
InternetUse	10.3	4.2	11.2	4.3	10.7	4.3
ExpectedGrowth	1	0.7	1.1	0.7	1	0.7
PercentLocal	63.6	34.3	64.8	32.4	64.1	33.4
	Percentage		Percentage		Percentage	
IndustryType						
Manufacturing/ Production	18.6%		31.1%		25.5%	
Service	81.4%		68.9%		74.5%	

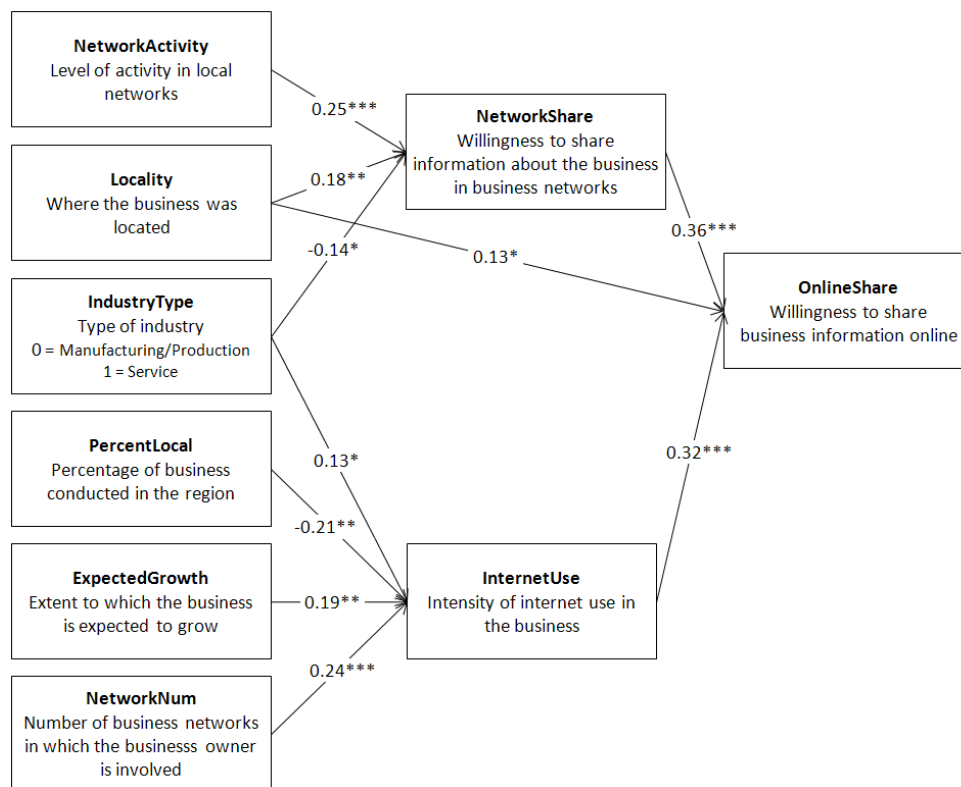
**Table 2:** Summary statistics for each locality

An initial regression analysis was carried out to identify those variables having a direct effect on *OnlineShare*. Backwards and forwards regression were used; both techniques led to the same model, with only 3 of the initial 10 independent variables having a statistically significant relationship with *OnlineShare*:

- *NetworkShare*: Willingness to share business information in a business network
- *InternetUse*: Extent of internet use in the business
- *Locality*: Indicator variable for the region in which the business was located

The  $R^2$  value for the final regression (with the three independent variables) was 30.1%, which is quite high for an investigation of this nature: over 30% of the variation in *OnlineShare* is explained by the three variables alone.

Subsequently, two additional regression analyses were carried out to investigate possible indirect effects and to construct an hierarchical path diagram. The first treated *NetworkShare* as the dependent variable, with all bar *InternetUse* as independent variables; the second treated *InternetUse* as the dependent variable with all bar *NetworkShare* as independent variables. The results are summarised in the path diagram in Figure 1.



\* = p-value < 0.05, \*\* = p-value < 0.01, \*\*\* = p-value < .001

**Figure 1:** Path diagram for *OnlineShare* (standardised estimates)

In addition to the three variables that had a direct relationship with *OnlineShare*, the following four variables were found to have an indirect relationship via either *NetworkShare* or *InternetUse*:

- *NetworkActivity* (Number of business networks in which the business owner is involved)
- *PercentLocal* (Percentage of business conducted in the region)
- *ExpectedGrowth* (Extent to which the business is expected to grow)
- *NetworkNum* (Number of business networks in which the business owner is involved)
- *IndustryType* (Type of industry, 0 = Manufacturing/Production, 1 = Service)

Two variables that we expected to have a relationship to *OnlineShare* were found to have no direct relationship:

- *NumEmployees*: The size of the enterprise as measured by number of employees
- *BusinessAge*: The age of the business.

These variables also failed to have an indirect effect via *NetworkShare* or *InternetUse*, although further analysis shows that *BusinessAge* did have a small but statistically significant negative effect on *ExpectedGrowth* ( $b = -0.15$ ) and *NumEmployees* did have a statistically significant effect on *NetworkNum* ( $b = 0.22$ ).

## 5 Discussion

The findings in this paper highlight factors that are related to SME inter-firm online knowledge sharing practices. In particular, the results highlight the interaction of



activity in the online environment and social characteristics of the owner-manager and the context in which they operate.

As expected, Figure 1 shows that the extent of Internet usage (*InternetUse*) is a major factor closely related to owner-managers' willingness to share knowledge online (0.38 correlation). We do not claim the relationship is causal, but we would anticipate that owner-managers who are comfortable using ICT would more readily share knowledge online. This finding is consistent with research which shows that owner-managers with knowledge of and confidence in using ICT are more likely to adopt eBusiness applications including email which can be used for online knowledge sharing purposes (Al-Qirim 2005; Del Aguila-Obra & Padilla-Meléndez 2006; Dholakia & Kshetri 2004; Wymer & Regan 2005).

A second factor found to be directly related to willingness to share knowledge online was the owner-manager's general inclination to share business information face-to-face in their business network. Again, this is not surprising as we would expect those unwilling to share knowledge more generally would also be unlikely to do so online. This is consistent with Chen et al. (2006) who found that online networks are an extension of SME owner-manager's face-to-face network. However, it is important to note that, although the variables are clearly related, just because an individual is willing to share information in face-to-face networks does not automatically mean that they are willing to share online. The correlation between the two variables *NetworkShare* and *OnlineShare* was (only) 0.42 and in fact further analysis shows that only 62% of those willing to share in networks were willing to share online.

Other aspects of our model, such as the indirect effects, are also interesting because they often reflect social (rather than just business-related) considerations:

- Not only did *BusinessAge* have no direct effect on *OnlineShare*, it failed to have an indirect effect via knowledge sharing in networks or internet use. We found only a small quite indirect effect via *ExpectedGrowth*. These findings are not entirely consistent with previous research which suggests that younger businesses are more likely to share knowledge face-to-face in their business networks (Chen et al. 2006; Salojarvi et al. 2005; Wong & Radcliffe 2000).
- There was indirect support for the claim that members who are more active in a network gain more value (Chipika & Wilson 2006; Miller et al. 2007) because there is an association between *NetworkActivity* and *NetworkShare*. In other words, those who are more active in their network appear also to be more willing to share knowledge, and through knowledge sharing they are more likely to gain value from such participation
- The literature suggests that SME owner-managers are more comfortable with network participation when they belong to a number of different networks (Chipika & Wilson 2006; Miller et al. 2007). However, we found no direct relationship between the number of networks owner-managers are involved in (*NetworkNum*) and their willingness to share business information in those networks (*NetworkShare*).
- Although *IndustryType* was not directly related to *OnlineShare*, it was indirectly related via both *NetworkShare* and *InternetUse*. SME owner-managers in service industries are more likely than those in manufacturing/production industries to use internet-based applications more intensely, but are less likely to engage in knowledge sharing activities within (possibly face-to-face) business networks.
- As expected, entrepreneurial owner-managers (as measured by *ExpectedGrowth*) and owner-managers who had a greater external focus (as measured by *PercentLocal*) appear to make greater use of the Internet (*InternetUse*), which in turn is linked to a greater willingness to share online. However, although

previous research (Bozbura 2007; Chipika & Wilson 2006; Edwards 2007; Fuller-Love & Thomas 2004; Thorpe et al. 2005) suggests that these types of owner-managers are more inclined to share knowledge in traditional networks, we found no significant association between either *ExpectedGrowth* or *PercentLocal* and knowledge sharing in networks (*NetworkShare*). It should be noted, however, that we did not include other entrepreneurship goals such as profit maximisation and this may explain the variation from previous research.

In summary, then, our findings support some, but not all, of the findings from previous research. In particular, we could have expected the independent variables *ExpectedGrowth*, *PercentLocal* and *NetworkNum* to be directly linked to *NetworkShare*. We have suggested some explanations for these findings, but another explanation is suggested by the fact that the locality-indicator variable *Locality* appears in the model. *Locality* directly influences online knowledge sharing and also acts indirectly via willingness to share information in face-to-face networks (*NetworkActivity*). This suggests that local influences, which are separate from the other influences measured by factors in our model, also affect the online knowledge-sharing behaviour of SME owner-managers. The precise nature of the influences is not captured by our work reported here, but they appear to be related to features of the networks themselves because the two cities and their environs were similar in many respects. In addition, the fact that *Locality* is directly related to both *NetworkShare* and *OnlineShare* suggests that differences between the two local networks we studied were sufficient to influence the extent to which SME owner-managers were willing to share knowledge with others, independent of the communication mechanism (face-to-face or online).

Thus we suggest that the nature of the social context outside the individual, possibly involving characteristics of the two networks themselves, is important. SMEs indicate willingness to share knowledge in networks to the extent that they anticipate value in doing so and some of this value comes from being more involved in and contributing to community activities; 'reputation' can provide real value to community members (Ostrom 1998). Thus value can be created and realised through strong social networks in which there is a high degree of trust, open communication, willingness to assist each other and common understandings. In the network where the level of trust was reported in interviews to be higher and there was a greater sense of inclusion (*Locality 2*), individuals felt obligated to other members of the group and more prepared to assist them by divulging information about their businesses. We conclude that the *Locality* variable encapsulates the quality of the social context specifically the business network. It would appear that the context helps shape owner-managers' attitudes towards (online) knowledge sharing, and that it is separate from (or additional to the) personal qualities which also seem to influence online knowledge sharing such as comfort with ICT and degree of entrepreneurial orientation.

## 6 Conclusion and further research

This research identified a number of key factors that are related to SMEs' willingness to share business knowledge online. The two main factors were the intensity of internet use for business purposes and the willingness to share business information across all formats. SME owner-managers who are willing to share knowledge face to face will not necessarily translate that willingness to share knowledge online even though they all had the technical capability to do so. Our findings suggest a more complex interaction of the owner-manager with the online business environment.

An interesting finding was the influence of *Locality* appeared to have on willingness to share knowledge online. This indicates that owner-managers will be influenced by the social context as well as factors such as where they trade, what growth they anticipate or how big they are. The social dimensions of networks are difficult to measure, in part because they are so much a matter of perception, but the dimensions involve trust,

connection, activity and inclusiveness. Our study points to the interconnection of these and other indicators and the importance of elements of the network itself. In particular, it suggests that those managing online SME knowledge sharing networks would do well to address ways to enhance the network itself.

Further research might usefully test the relationships we identified in other contexts. It might also be useful to include additional indicator variables into the model. Another avenue for research would be to explore online knowledge-sharing behaviours among owner-managers as they become familiar with new social media such as Facebook and LinkedIn - the work reported in this paper would suggest that the *social* experience might be more important than any additional technical functionality of those applications. Finally, the dynamics by which knowledge-sharing networks are created also requires further research. The work reported in this paper might lead one to conclude that only those existing networks that are already socially robust and possess high levels of social connectedness should bother to try online knowledge sharing. It would be useful to explore techniques for generating social connectedness as part of a project to develop online knowledge sharing.

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